

Patent claims

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1. Single- or multi-layer film having at least one layer (I) of a polyamide with nano-scale nucleating particles dispersed therein, characterised in that the smallest particle constituents forming a rigid unit in the dispersion have, as a number-weighted average of all the constituents, a dimension no greater than 100 nm in at least one direction that is randomly selectable for each constituent, when the layer (I) is cooled from its fully molten state at a cooling rate of from 10° to 20°C per minute, crystalline structures that emanate from the surface of the particles are formed, the amount by weight of the particles, based on the total weight of the polyamide forming the layer (I), is from 10 ppm to 3000 ppm, the polyamide forming the layer (I) contains at least 90 % polyamide 6, based on the total mass of the polyamide in that layer.
  2. Film according to claim 1, characterised in that layer (I) contains, in addition to polyamide 6, a polyamide selected from the group consisting of polyamide 6, polyamide 10, polyamide 12, polyamide 66, polyamide 610, polyamide 6I, polyamide 612, polyamide 6/66, polyamide 6I/6T, polyamide MXD6, polyamide 6/6I, polyamide 6/6T, polyamide 6/IPDI, copolymers of the monomers forming those polymers, or mixtures of those polymers or copolymers.
  3. Film according to either claim 1 or claim 2, characterised in that the particles dispersed in layer (I) have particles that, in two directions that are perpendicular to each other and are randomly selectable for each particle, each have a dimension of at least ten times the dimension of the particles in the direction having the smallest dimension.
  4. Film according to any one of claims 1 to 3, characterised in that the particles used in layer (I) are layered silicates.

5. Multi-layer film according to any one of claims 1 to 4, characterised in that it contains, in addition to one or more layers (I), further polyamide-containing layers (II) containing no or less than 10 ppm nano-scale nucleating agent.

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6. Film according to any one of claims 1 to 5, characterised in that it contains one or more EVOH-containing layers (III).

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7. Multi-layer film according to any one of claims 1 to 6, characterised in that it has an at least single-layer sealing layer (V) on one outer side of the multi-layer film.

8. Multi-layer film according to any one of claims 1 to 7, characterised in that it contains one or more adhesion-promoting layers (IV).

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Sub B3

9. Multi-layer film according to any one of claims 1 to 8, characterised in that it contains, in addition to the layers (I) and optionally (II), (III), (IV) and/or (V), one or more further polymeric layers.

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10. Film according to any one of claims 1 to 5, characterised in that it has only polyamide-containing layers.

11. Film according to any one of claims 1 to 6, characterised in that it has only polyamide-containing and EVOH-containing layers.

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12. Film according to either claim 10 or claim 11, characterised in that it has a thickness of from 13 to 30  $\mu\text{m}$ .

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13. Film according to any one of claims 1 to 12, characterised in that it has been produced in the form of a flat film.

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14. Film according to any one of claims 1 to 13, characterised in that layer (I) forms an outer layer of the film.

5 15. Film according to any one of claims 1 to 14, characterised in that at least one layer (I) is subjected, after extrusion, to a stretching operation only in the longitudinal direction, only in the transverse direction, first in the longitudinal and then in the transverse direction, in the longitudinal and transverse directions simultaneously, or combinations thereof.

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16. Use of a multi-layer film according to any one of claims 1 to 15 in the packaging of foodstuffs on shape-fill-seal machines.

Add B5

FOODSTUFFS